

Ohio Agricultural Experiment Station

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MINOR ITEMS OF FARM EQUIPMENT

INTRODUCTION

This circular regarding the Minor Items of Farm Equipment, which has been prepared by Mr. L. W. Ellis of the Office of Farm Management Investigations, United States Department of Agriculture, Bureau of Plant Industry, in cooperation with the Ohio Experiment Station, is based entirely on inventories taken either by himself or by members of the Ohio Station staff upon thirty-three Ohio farms that are well distributed throughout the State. It would seem, therefore, that his statement that "The minor items for a general farm of 160 acres in Ohio and other Middle-Western States will probably cost from \$200 to \$300 by the time the equipment is complete," instead of \$25 to \$50, as many of us have assumed, should at once challenge our serious consideration. An error of five hundred percent or more in our calculations, especially when it is on the wrong side of the account and runs into the hundreds, is indeed serious, and surely the suggestion by a good authority that such an error does exist should inspire many of us to check the figures that have been given us with the conditions upon our own farms.

In order to facilitate this checking it has been arranged to have the tables on pages 11 to 15 inclusive set with two extra blank columns marked "Number" and "Price of Each" respectively. It is hoped that a few of Ohio's progressive farmers will use these columns to take an inventory of their own minor equipment and that they will favor the Experiment Station with a copy of same. If the original is sent to the Station it will undertake to have the computations made and to return a copy to the sender. If more inventories are received than can be cared for promptly the originals will be returned to the senders without delay. Any variation from the figures or totals as given by this circular will not be taken as captious criticism either by the United States Department of Agriculture or by the Ohio Experiment Station. Both institutions wish to know the facts. The present statement is based on inventories from thirty-three farms only. If figures from a much larger number of farms can be secured the value of future deductions will be correspondingly increased.

L. H. GODDARD.

MINOR ITEMS OF FARM EQUIPMENT

By L. W. ELLIS

Among the leaks in farming to which—because of their apparent unimportance—little attention has been directed, is the waste which occurs through a general lack of comprehension as to the extent and value of the small items which are necessary to the smooth running of the farm. This waste exhibits itself in extra expense through the purchase of unnecessary items; loss of time and discounts in buying numerous articles singly or in small lots; loss, theft and rapid depreciation of items considered too insignificant to require systematic care; and, if the farm is insufficiently equipped, in the losses in many directions through the lack or misplacement of equipment at times when it is urgently needed.

A previous publication (*) has to a greater or less extent emphasized all the foregoing points in discussing the advantages to be gained from having on the farm at all times the workshop tools and materials necessary for keeping in a high state of efficiency the equipment upon which the successful management of the modern farm so largely depends. It is the purpose of this circular to lay even greater emphasis upon certain of these points, and to present the results of a study made for the purpose of determining the amount and cost of all minor items of equipment necessary for a farm of general type. This study did not include wagons, machinery, or other articles which through bulk or value would be classed as items of major importance, but was confined to the consideration of the miscellaneous small tools, utensils and sundries usually purchased singly or in small groups at a slight cost per article.

The total cost of the miscellaneous articles is usually much higher than the estimates given by farmers and writers on agricultural subjects but, owing to the great number of small purchases made, is seldom realized except by the few who have made careful inventories at stated intervals. The ignorance of this fact leads farmers in general to neglect an extremely valuable portion of their equipment, and it would probably be found that the decrease in value of the small articles is much more rapid than that of the

* U. S. Department of Agriculture Farmers' Bulletin 347, "The Repair of Farm Equipment". This bulletin discusses the importance of making minor repairs on the farm, and the character and use of tools, workshop facilities and materials for repair work. It will be sent free on application to the Secretary of Agriculture, Washington D. C.

major items, for which an annual rate of depreciation of 7.3 percent has been established. (*) The low estimates regarding this portion of the equipment also prove disappointing to the manager of a new farming venture who finds it necessary to make an increased outlay on this account, attended by readjustment of his plans.

The importance of having a good working equipment in small items, and the absolute necessity for caring for it, are matters which should be apparent to the thoughtful farmer, and need not be dwelt upon further. The waste of time in making numerous special trips for small articles is also apparent, especially so when it is considered that many of these occur in the busiest seasons. This could be avoided to a large extent by taking an inventory during a slack period and replacing all missing items at the next opportunity. Concerning the loss through ignorance of what is needed, however, less has been said, and it is to the requirements in miscellaneous items and the purchase thereof that this circular will be largely devoted.

In selecting the minor equipment for a given farm, consideration must be given not only to the items needed for the care and repair of buildings, fences, machinery, etc., but to those used for the care of livestock, the production of crops, and various other interests of the farm. With every change in type of farm involving a new combination of enterprises a change in minor equipment will be necessary. For each of the many specialized types of farms certain articles will be needed which will not be found on the general run of farms. To attempt to determine the equipment in small items necessary for all these special types is beyond the scope of this circular, which will attempt to cover only those items found in most common use on farms of the general type. By this is meant a farm of moderate size on which both crops and livestock are raised without particular emphasis on the production or disposition of any one product.

The nature of minor equipment will be determined largely by the character of the farm enterprises and the distance of the farm from repair and shopping facilities, while the extent may be governed by the size of the farm, the number of workmen and the financial circumstances of the proprietor. Perhaps both will be influenced most by the latter's attitude with regard to small economies, and his ability to use tools to the best advantage.

* U, S Department of Agriculture, Bulletin 73, Bureau of Statistics.

CLASSIFICATION OF MINOR EQUIPMENT

For convenience in considering the small items which go to equip the farm they may be classified according to use in connection with different enterprises.

On every farm, however, there are many articles used in the administration of the entire farm rather than for the conduct of any one enterprise. This general purpose equipment would include the articles already mentioned for the repair of the equipment, including the wood working and metal working tools, and certain repair materials such as wood, iron, paint, oil, etc. The weighing apparatus, tools for drainage and fencing, stone working tools, and many items which cannot easily be classified will also be listed as general purpose equipment.

A strict classification of miscellaneous articles according to use cannot be made because of the varying uses to which the same articles are put on different farms. For instance, certain tools connected with the garden, orchard and dairy, may be either household or farm equipment, depending on whether these are enterprises conducted simply for supplying the wants of the family or for the production of marketed products. Butchering tools would come under both classes where animals are slaughtered in excess of the needs of the family. On a majority of general farms, however, the butchering, orchard, garden and lawn equipment would pertain to the household, rather than to the producing enterprises, while the dairy equipment and ice tools might be both household and farm equipment at different seasons of the year.

Certain articles can be attributed directly to the presence on the farm of a given class of livestock, but many others are used in connection with several classes of stock, and still others may be used in connection with the stable rather than with the animals themselves. In consequence, in addition to classifying articles as equipment for horses, cattle, sheep, hogs, poultry, and bees, respectively, there may be a classification designated as "all stock" equipment to include the last named articles. The same thing is true with regard to the equipment for crop production. As in the case of larger machinery there will be a class of "all crop" tools, etc., as well as the items needed especially for corn, hay, small grains, potatoes, or other crop enterprises.

LIVESTOCK EQUIPMENT

The minor livestock equipment will consist of the items used directly for the care and management of horses, cattle, sheep, swine, poultry, bees, etc. The items classified as "all stock equipment"

need not necessarily pertain to all of the classes of stock listed, but are regarded as being for the use of two or more classes, or for the care of the stables or other quarters used by the stock. Under all stock equipment would be included brooms, shovels, forks, rakes, pails, wheelbarrows, etc., used in caring for the stables; baskets and measures for feeding; hand spraying apparatus for sanitary purposes; and such things as blankets, brushes, curry-combs, clippers, halters, ropes, etc., which might be classified either as all stock equipment or as that for some special class of stock, according to the usage of the individual farm.

Under the general head of horse equipment there has been classified for convenience both the items used directly in the management of the animals, and those used in driving or working the same. Since horses are used for both power and breeding purposes it is difficult to separate the items which are used exclusively for the general purposes of the farm. Many of these will be dispensed with on certain farms, and considered necessary on others. Some may be regarded as personal rather than pertaining to the farm business, but since in the management of the farm a great deal of driving is necessary it seems fitting to include under the head of farm equipment the numerous articles needed for the care of the driving stock, vehicles, harness, etc.

The miscellaneous cattle equipment will consist of those few items which will be found on general farms for the management of stock cattle, and on some farms the dairy equipment will be regarded as belonging to the cattle enterprise. In some sections of the country there will be a few extra items on account of use of oxen for draft purposes, but these will not be found on many farms in the western states. On the comparatively few farms where cattle are fitted for show purposes a few articles such as clippers, cabinet scrapers, spoke shaves, etc., will be in demand for trimming the hair, horns, and feet of the show animals.

No veterinary instruments will be recommended under either horse or cattle equipment except the very simple ones which are found in general use. Naturally the farmer who is something of a specialist along any line will wish to equip himself much more heavily than the ordinary one.

The dairy equipment will, of course, vary extensively according to the extent of the dairy enterprise and the disposition of the product. Besides the separator, which is in general use among the more progressive farmers, there are on some farms the machines and utensils necessary for manufacturing cheese or butter on a large scale. From the majority of general farms, however, the

product is usually sold either as whole milk or as hand separated cream. In the case of the sale of whole milk the whole dairy equipment might consist of nothing more than a few pails, a strainer, and several milk cans. For a small part of the year butter may be made upon the farm and sold elsewhere. In such cases a small churn, thermometer, butter bowl, a few butter crocks, milk crocks or pans, a butter ladle, and occasionally a butter print might be added to the former list. For the manufacture on a larger scale of either butter or cheese considerable extra equipment would be necessary, and the farms in this case would probably be classified as other than of the general type. The items already listed may be found on a great many farms where dairying is not one of the principal enterprises, and it is of this type of farm rather than the specialized plants that we wish to treat in this circular.

On farms where only a few sheep are kept one or more pairs of shears are frequently the entire special sheep equipment. Other items such as sheep bells, wool cards, hand clippers, and clipping machines may be included, also a dipping tank and the necessary dip, although several of these items would probably be regarded as major equipment. It is frequently hard to distinguish between the large and small items, but the aim is here to present only the multitude of miscellaneous articles the need for which would not naturally occur to one in the organization of the farm.

The most necessary article used in connection with swine seems to be the ring plier, and the accompanying box of rings. The small portable hog houses might be classed as miscellaneous equipment, and they are of frequent occurrence in the inventories. A snout clipper, tongs, pig forceps, and pig extractors are sometimes useful.

As a rule the poultry equipment on the general farm is confined to a very few items, and on many no special purchases have been made. Where incubators and brooders are bought a number of useful articles are usually included, and it is only occasionally that additional equipment is purchased. There are, of course, many items which would be found in connection with the specialized poultry farm which are omitted, as well as some which should probably be found oftener on general farms.

Bees are classed as livestock for want of a better designation, and where bees are found on the farms there are usually found a number of special items of minor value. Portable houses for storing bees throughout the winter are found in only a few cases and may be listed with the items of major equipment. The various items of bee equipment are illustrated and their use described in *Farmers' Bulletin* 59.

MISCELLANEOUS CROP EQUIPMENT

The small and miscellaneous equipment for the production and disposition of crops will include some items which pertain equally to several. These are hoes, baskets, shovels, forks, rakes, scythes, etc., but the class of all crop tools is usually small. In addition to the large machinery drawn or operated by horses each crop has several special items. The corn crop has for its special miscellaneous equipment usually a hand planter; a home made seed tester; a seed rack; several corn knives; and husking pegs, gloves or hooks; and frequently also such items as baskets, seed crates, ensilage forks, a seed corn grader, a shock tyer, and a horse for shocking. In cases where the ordinary wagon box is used for husking corn from the stalk a scoop board or patent end gate is a great convenience.

The small grains such as wheat, oats and barley, require certain special articles. A large number of grain sacks is probably the most frequent item in this regard. On many farms will be found the scythe or cradle, and occasionally a flail, the latter home made. A binder cover is a useful item, and is sometimes included in the purchase price of the binder. The scoop shovel, half bushel measure, a bushel basket, etc., may apply to small grains as well as to corn, potatoes, or other crops. A wooden hand rake is frequently a great saver of grain in a field, and a long tined straw fork a great convenience in handling straw in the barn.

In fitting up the barn for convenience in handling hay there will be needed a track and carrier, the single or double harpoon fork, or hay slings, a number of pulleys, a seven-eighths to one inch hay rope, and the lighter half or five-eighths inch trip rope. Some of these items, once they are installed, are regarded as part of the barn fixtures, and left permanently in place. Others especially the ropes and forks, are frequently taken from place to place by tenants, and their frequent renewal justifies classifying them as miscellaneous equipment. Several pitchforks, a hay knife, a scythe and snath, a baled hay hook and a hand seeder are commonly used.

Where potatoes are grown commercially there are frequently a large number of potato boxes or crates, a potato fork, a hand planter and potato scoop. On one Ohio farm where sugar beets were grown the small items included several beet forks, beet hoes and topping knives. In some sections the production of maple sugar and syrup forms an important farm enterprise requiring special equipment. Each crop has a few peculiar items of equipment, and the term "general farm" is broad enough to include many enterprises. The

foregoing classes of equipment will, however, apply to the majority of general farms in the northern and western sections of the United States.

EXTENT OF MINOR EQUIPMENT

For the purpose of ascertaining how much of the miscellaneous equipment discussed would be necessary on general farms, the annual inventories on the farms of thirty-three cooperators in Ohio were made as complete as possible with respect to the minor items. These farms included one poultry, truck and general farm, one large horse farm, and a number on which dairying was the principal enterprise, yet none departed radically from the general type. The average size was a trifle less than 167 acres, and the average equipment, as nearly as it can be determined, is given in tabular form on pages 11 to 15 inclusive.

The table showing the summary of the minor equipment inventories must be studied closely in order to be of the greatest value. Not all the items listed are necessary for a satisfactory farm equipment, and on no farm was a complete list found. No farm combined all the enterprises represented, yet every item in the list was found on one or more of these farms, and a few others were omitted as being of extremely unusual character and unlikely to occur in many cases. Many items which might be called farm equipment because found in farm homes rather than those in town are not included, the aim being to present a suggestive list of miscellaneous farm tools, etc., for the convenience of the farm manager. The use of the various tools is not described, as only the more common have been included and local merchants are usually familiar with all the items listed.

The table is designed to show the relative importance of the various items and approximately what would be required for a complete equipment. The first column shows the percentage of the whole number of farms from which each article was reported in the inventories. It is probable that in many cases there should be a slight increase in the percentage shown, owing to failure to get all the articles on some of the farms. It is believed, however, to be relatively correct as between the different articles. In the second column is shown the average number of each article on the farms which report the same. In the third column is the number which the *inventories* suggest as approximately the average for a well equipped general farm under the conditions obtaining in Ohio. In making up this number it has been necessary to consider the percentage of farms reporting each article, the average number of articles per farm reporting and the same average for the whole number of farms. The suggested number is the nearest whole number to the

mean found between the two averages. For example, the T-handled wood auger is reported from twenty-two out of thirty-three farms, or 67 per cent. A total of 67 augers was found on these farms, or 3.04 per farm reporting, and 2.03 per farm for the whole number. The mean is 2.54 and the suggested number 3. With one or two exceptions no article is included in the third column, however, which was not reported from at least 20 percent of the farms and for which the average per farm, for the whole number of farms, was less than three-tenths. In this way consideration was given to the fact that on some farms certain items are not reported, and to the fact that on farms which do report the various items there are undoubtedly cases in which fewer articles than those found would be adequate. This last is certainly true since in many cases where several tools of a kind are kept, a part are old, and are retained simply for occasional use. The arbitrary basis given was adopted because it was found to mark quite accurately the dividing line between what was considered essential and non-essential by the owners of several well equipped farms. The column containing the number suggested is not necessarily a recommendation as to what will be urgently needed for a farm of average size and type, but it is indicative of the number of articles suggested by the inventory. By carefully considering the needs of the farm the manager can cut down the list materially. The oil cans, wrenches, eveners, etc., purchased with machines were excluded, wherever practicable, from the inventories, hence the suggested number is less in many cases than the real total for such items.

In the fourth column is given a figure for the first cost of the various articles, the price of all being included for reference, even though the the articles are not all recommended for use. The price for the complete article, for example, a tool with handle, is given in most cases. This price has been obtained wherever possible from hardware merchants located in sections from which the inventories are taken. The majority of hardware items were priced by one of the leading hardware merchants of Wayne County, Ohio. Other prices were obtained from Farmers' Bulletin 347. Still others were supplied by various farmers who had purchased or made similar items within a few months of the date of inventory. These prices will, of course, vary a great deal with the location of the purchaser and the quality of the goods. Regarding the latter, however, the point was emphasized in obtaining prices that average figures were wanted for the quality of goods usually purchased by farmers. These prices are merely suggestive and cannot in all cases be relied upon, for the reasons just mentioned.

The total cost of the various items suggested is extended in the fifth column. The total, which seems extremely large in comparison with the usual estimates is, however, not unreasonable if a rather complete inventory is desired. Taking the grand total inventory of items mentioned in this list for all the farms, using the prices given in column four, and dividing by thirty-three, the first cost for the average farm of 167 acres is found to be about \$190.00. The discrepancy between this figure and that for the suggested column may be due partly to incomplete inventories, but more to the fact that the latter contains a large number of single articles for which the mean spoken of on page 10 was a fraction greater than one-half and less than one. The suggested column indicates a rather complete outfit. Neither figure, however, includes any allowance for a stock of materials for the repair of equipment as given in Farmers' Bulletin 347. An expenditure of \$50.00 or more in this connection would save many trips to town for materials, even if the equipment for making use of them were complete. Many items considered useful and necessary might be added to the list in the suggested column, but the purpose of this circular is to establish what might be called a working basis for considering this phase of equipment. The occasional need for many of these omitted items will be apparent and attention is called to the fact that the list in column three contains only 158 out of 240 articles, all of which were considered necessary in certain cases. The initial expense, if all the items were included in the quantity shown in column 2 would be over \$685.00, and it is not an uncommon thing to find farms in the United States on which the actual investment in small and miscellaneous items would be above this figure if all the tools had been bought first hand. The summary of the thirty-three inventories is given as follows:

SUMMARY OF INVENTORIES

Items	Per cent farms reporting	Average per farm reporting	Number suggested	Cost	Total	Inventory*	
						Number	Price of each
General Purpose:							
1 Auger.....	67	3 0	3	\$.25	\$.75	.....	1
2 Awl.....	27	1 9	1	.10	.10	.....	2
3 Axe and handle.....	88	2 1	2	1.25	2.50	.....	3
4 Pinch bar.....	64	1.1	1	.75	.75	.....	4
5 Bench screw.....	55	1 0	1	.60	.60	.....	5
6 Auger bit.....	94	6.7	7	.30	2.00	.....	6
7 Bit brace.....	94	1.2	1	1.50	1.50	.....	7
8 Steel square.....	85	1.1	1	.75	.75	.....	8
9 Bevel square.....	35	1.0	1	.40	.40	.....	9
10 Try square.....	25	1.0	1	.25	.25	.....	10
11 Wood chisel.....	73	4.3	4	.40	1.50	.....	11
12 Compass.....	42	1.0	1	.30	.30	.....	12
13 Level.....	64	1.2	1	.75	.75	.....	13
14 Drawing knife.....	91	1 3	1	.75	.75	.....	14

* These columns have been inserted to assist persons interested in taking an inventory of their own farms as mentioned on page 2.

SUMMARY OF INVENTORIES—Continued

Items	Per cent farms reporting	Average per farm reporting	Number suggested	Cost	Total	Inventory	
						Number	Price of each
General purpose—Continued							
15 Scratch gauge.....	45	1.4	1	\$.40	\$.40	.....	15
16 Gimlet bits.....	55	3.0	2	.20	.40	.....	16
17 Grub hoe.....	21	1.1	1	.50	.50	.....	17
18 Claw hammer.....	82	1.3	1	.50	.50	.....	18
19 Hand axe.....	36	1.0	1	.50	.50	.....	19
20 Hatchet.....	70	1.4	1	.75	.75	.....	20
21 Screw driver.....	67	1.7	1	.25	.25	.....	21
22 Log chain.....	82	2.5	2	1.50	3.00	.....	22
23 Wooden mallet.....	36	1.5	1	.25	.25	.....	23
24 Mattock.....	79	1.4	1	.75	.75	.....	24
25 Compass saw.....	42	1.0	1	.30	.30	.....	25
26 Hand saw.....	94	1.7	2	1.25	2.50	.....	26
27 Crosscut saw (large).....	85	1.2	1	3.00	3.00	.....	27
28 Plane.....	73	2.3	2	1.25	2.50	.....	28
29 Iron wedge.....	79	2.5	2	.30	.60	.....	29
30 Tape line.....	39	1.1	1	.50	.50	.....	30
31 Rasp.....	39	1.1	1	.50	.50	.....	31
32 Brush hook or scythe.....	21	1.0	1	1.25	1.25	.....	32
33 Cant hook.....	42	1.4	1	1.25	1.25	.....	33
34 Chalk line.....	27	1.0	1	.10	.10	.....	34
35 Buck saw.....	10	1.0	1	.75	.75	.....	35
36 Carpenters' pinchers.....	30	1.2	1	.60	.60	.....	36
37 Anvil.....	21	1.0	1	10.00	10.00	.....	37
38 Vise.....	15	1.2	1	5.50	5.50	.....	38
39 Forge.....	3	1.0	1	16.00	16.00	.....	39
40 Combination drill press.....	23	1.0	1	4.00	4.00	.....	40
41 Drills.....	27	3.9	4	.50	2.00	.....	41
42 Tinnern's snips.....	18	1.0	1	1.25	1.25	.....	42
43 Cold chisel.....	73	2.3	2	.20	.40	.....	43
44 Whetstone.....	24	1.8	1	.10	.10	.....	44
45 Screwplate.....	27	1.0	1	10.00	10.00	.....	45
46 Tongs.....	6	2.0	1	.50	.50	.....	46
47 Flat file.....	70	2.0	2	.15	.30	.....	47
48 Round file.....	35	1.5	1	.30	.30	.....	48
49 Taper file.....	42	2.2	2	.10	.20	.....	49
50 Oil can.....	30	1.7	1	.10	.10	.....	50
51 Machine oil (gals.).....	61	.8	1	.30	.30	.....	51
52 Pipe wrench.....	24	1.3	4	1.50	1.50	.....	52
53 Monkey wrench.....	64	2.1	2	.50	1.00	.....	53
54 Tool grinder.....	30	1.0	1	3.00	3.00	.....	54
55 Grindstone.....	91	1.0	1	4.00	4.00	.....	55
56 Riveting hammer.....	39	1.5	1	.75	.75	.....	56
57 Sledge hammer.....	33	1.1	1	1.00	1.00	.....	57
58 Pliers.....	67	1.4	1	.50	.50	.....	58
59 Nippers.....	52	1.5	1	1.00	1.00	.....	59
60 Punch.....	33	2.2	2	.15	.30	.....	60
61 Hack saw.....	18	1.0	1	.50	.50	.....	61
62 Saw set.....	36	1.0	1	.60	.60	.....	62
63 Maul.....	16	1.0	1	.60	.60	.....	63
64 Post hole digger.....	41	1.5	1	1.25	1.25	.....	64
65 Wire splicer.....	11	1.3	1	1.00	1.00	.....	65
66 Wire stretcher.....	29	1.1	1	1.00	1.00	.....	66
67 Ditch cleaner.....	22	1.0	1	1.25	1.25	.....	67
68 Tile spade.....	31	1.6	1	1.00	1.00	.....	68
69 Brick trowel.....	44	1.4	1	.40	.40	.....	69
70 Plastering trowel.....	6	1.0	1	1.00	1.00	.....	70
71 Sand sieve.....	16	1.4	1	.50	.50	.....	71
72 Pick.....	31	1.9	1	1.00	1.00	.....	72
73 "D" handled shovel.....	31	1.4	1	1.00	1.00	.....	73
74 Long handled shovel.....	13	1.3	1	1.00	1.00	.....	74
75 Counter scale.....	16	1.0	1	5.00	5.00	.....	75
76 Spring balance.....	34	1.1	1	.50	.50	.....	76
77 Steelyards.....	28	1.1	1	2.00	2.00	.....	77
78 Platform scale.....	38	1.0	1	8.00	8.00	.....	78
79 Rat trap.....	24	1.0	1	.50	.50	.....	79
80 Steel trap.....	26	2.1	1	.15	.15	.....	80
81 Jackscrew.....	3	5.0	1	2.00	2.00	.....	81
82 Step ladder.....	45	1.4	1	1.75	1.75	.....	82
83 Ladder.....	52	1.4	1	2.00	2.00	.....	83
84 Farm bell.....	58	1.0	1	2.00	2.00	.....	84
85 Lantern.....	68	1.8	2	.90	1.80	.....	85
86 Hoisting block.....	16	1.2	1	2.00	2.00	.....	86
87 Barrel.....	71	3.0	3	.75	2.25	.....	87
88 Padlock.....	39	1.8	1	.40	.40	.....	88

SUMMARY OF INVENTORIES—Continued

Items	Per cent farms reporting	Average per farm reporting	Number suggested	Cost	Total	Inventory	
						Number	Price of each
General purpose—Con.							
89 Paint brush.....	48	3.3	2	\$.30	\$.60	.....	89
90 Whitewash brush.....	26	1.4	1	.75	.75	.....	90
91 Basket.....	52	5.8	4	.30	1.20	.....	91
Household and farm:							
92 Lard press and sausage stuffer.....	45	1.0	1	5.50	5.50	.....	92
93 Sausage grinder.....	48	1.0	1	2.00	2.00	.....	93
94 Hog scraper.....	10	2.8	2	.10	.20	.....	94
95 Hog hook.....	29	1.1	1	.05	.05	.....	95
96 Butcher knife.....	52	2.4	2	.30	.60	.....	96
97 Kettle.....	55	1.7	1	2.50	2.50	.....	97
98 Tree pruner.....	15	1.2	..	1.50	.....	.....	98
99 Pruning shears.....	39	1.3	1	.40	.40	.....	99
100 Crates.....	39	54.7	40	.40	16.00	.....	100
101 Garden rake.....	64	1.2	1	.50	.50	.....	101
102 Hoe.....	88	2.4	2	.40	.80	.....	102
103 Cultivator.....	12	1.3	..	4.00	.....	.....	103
104 Trowel.....	12	1.3	..	.25	.....	.....	104
105 Cold frame.....	3	8.0	..	2.50	.....	.....	105
106 Flat.....	3	3.0	..	.10	.....	.....	106
107 Spade.....	36	1.4	1	.75	.75	.....	107
108 Sprinkler.....	21	1.1	..	.50	.....	.....	108
109 Lawn mower.....	64	1.0	1	4.00	4.00	.....	109
110 Lawn rake.....	21	1.0	..	.40	.....	.....	110
All stock:							
111 Broom.....	9	2.0	..	.30	.....	.....	111
112 Clipping machine.....	15	1.0	..	6.00	.....	.....	112
113 Manure fork.....	42	2.6	2	.70	1.40	.....	113
114 Pail.....	27	4.4	3	.15	.45	.....	114
115 Tie chain.....	18	5.3	3	.25	.75	.....	115
116 Tie rope.....	9	2.3	..	.25	.....	.....	116
117 Hand sprayer.....	12	1.0	..	.75	.....	.....	117
118 Wheelbarrow.....	42	1.4	1	4.00	4.00	.....	118
Horse and driving:							
119 Bit.....	40	2.4	2	.40	.80	.....	119
120 Blanket.....	91	2.8	3	2.00	6.00	.....	120
121 Brush.....	89	2.0	2	.50	1.00	.....	121
122 Currycomb.....	89	2.3	2	.25	.50	.....	122
123 Collar.....	43	2.7	2	3.00	6.00	.....	123
124 Harness oil (qts.).....	34	1.5	2	.25	.50	.....	124
125 Fly nets.....	34	2.8	2	1.00	2.00	.....	125
126 Halters.....	97	6.5	6	.75	4.50	.....	126
127 Muzzle.....	26	1.8	2	.20	.40	.....	127
128 Nosebag.....	14	1.4	..	.50	.....	.....	128
129 Sweat pad.....	37	2.2	2	.35	.70	.....	129
130 Harness punch.....	69	1.2	1	.50	.50	.....	130
131 Riveting machine.....	69	1.0	1	.50	.50	.....	131
132 Rivets (boxes).....	43	1.2	1	.10	.10	.....	132
133 Tie rope.....	81	2.8	2	.15	.30	.....	133
134 Saddle.....	57	1.0	1	10.00	10.00	.....	134
135 Riding bridle.....	23	1.3	1	1.00	1.00	.....	135
136 Snaps.....	23	7.4	4	.05	.20	.....	136
137 Sponge.....	14	2.0	1	.10	.10	.....	137
138 Neck straps.....	43	1.9	1	.75	.75	.....	138
139 Syringe.....	23	1.1	1	.60	.60	.....	139
140 Storm apron.....	17	1.2	1	.75	.75	.....	140
141 Buggy jack.....	40	1.1	1	.75	.75	.....	141
142 Wagon jack.....	14	1.0	..	1.00	.....	.....	142
143 Clevis.....	40	4.3	3	.50	.30	.....	143
144 Chamois skin.....	11	1.0	..	.50	.....	.....	144
145 Dust robe.....	62	1.2	1	1.00	1.00	.....	145
146 Lap robe.....	71	1.6	1	5.00	5.00	.....	146
147 Evener, 2-horse.....	60	2.0	2	1.50	3.00	.....	147
148 Evener, 3 or 4 horse.....	63	1.5	1	2.00	2.00	.....	148
149 Storm front.....	46	1.1	1	4.00	4.00	.....	149
150 Dash lantern.....	23	1.4	1	1.00	1.00	.....	150
151 Neck yoke.....	14	1.6	1	1.00	1.00	.....	151
152 Whiffle-tree.....	29	3.1	2	.30	.60	.....	152
153 Whip.....	60	1.4	1	.50	.50	.....	153
154 Whisk broom.....	11	1.0	..	.10	.....	.....	154
Cattle:							
155 Cow bell.....	6	1.5	..	.25	.....	.....	155
156 Calf muzzle.....	3	1.0	..	.20	.....	.....	156
157 Crate.....	3	1.0	..	.50	.....	.....	157
158 Tie rope or chain.....	39	3.9	3	.30	.90	.....	158
159 Dehorning clipper.....	9	1.0	..	6.00	.....	.....	159
160 Milk tube.....	15	1.0	..	.25	.....	.....	160

SUMMARY OF INVENTORIES—Continued

Items	Per cent farms reporting	Average per farm reporting	Number suggested	Cost	Total	Inventory	
						Number	Price of each
Dairy:							
161 Milk can.....	36	4.9	4	\$ 1.50	\$ 6.00	.....	161
162 Milk crock.....	27	9.9	7	.10	.70	.....	162
163 Milk pan.....	6	5.0	..	.20	.....	.....	163
164 Milk pail.....	70	3.2	3	.50	1.50	.....	164
165 Churn.....	45	1.1	1	4.00	4.00	.....	165
166 Butter crock.....	21	10.1	6	.20	1.20	.....	166
167 Butter bowl.....	21	1.0	..	.50	.....	.....	167
168 Butter scales.....	6	1.0	..	1.50	.....	.....	168
169 Strainer.....	30	1.0	1	.50	.50	.....	169
170 Skimmer.....	6	1.0	..	.10	.....	.....	170
171 Thermometer.....	24	1.0	1	.25	.25	.....	171
Sheep:							
172 Bell.....	12	5.0	3	.15	.45	.....	172
173 Shears.....	48	1.6	1	1.00	1.00	.....	173
Swine:							
174 Ring plier.....	58	1.1	1	.20	.20	.....	174
175 Rings (boxes).....	..	..	1	.10	.10	.....	175
176 Snout clipper.....	3	1.0	..	.40	.....	.....	176
177 Tong.....	3	1.0	..	.50	.....	.....	177
178 Crate.....	15	2.0	..	1.00	.....	.....	178
179 Portable house.....	39	6.6	5	4.00	20.00	.....	179
Poultry:							
180 Fountain.....	6	3.5	..	.25	.....	.....	180
181 Feed hopper.....	3	3.0	..	.25	.....	.....	181
182 Trap nests.....	3	8.0	..	.25	.....	.....	182
183 Feed pan.....	3	6.0	..	.05	.....	.....	183
184 Feed sieve.....	3	1.0	..	.25	.....	.....	184
185 Hover box.....	3	6.0	..	.25	.....	.....	185
186 Egg tester.....	6	1.0	..	.15	.....	.....	186
187 Coop.....	3	3.0	..	3.00	.....	.....	187
188 Leg bands.....	6	50.5	..	.....	.....	.....	188
189 Bone cutter.....	6	1.0	..	6.00	.....	.....	189
Bees:							
190 Foundation (lbs.).....	6	6.0	..	.75	.....	.....	190
191 Section box (100).....	12	2.8	..	.75	.....	.....	191
192 Foundation fastener.....	9	1.0	..	.75	.....	.....	192
193 Hive.....	15	19.6	..	1.00	.....	.....	193
194 Super.....	12	30.3	..	.50	.....	.....	194
195 Smoker.....	12	1.0	..	1.00	.....	.....	195
196 Bee escape.....	6	2.0	..	.25	.....	.....	196
197 Bee veil.....	9	1.3	..	.10	.....	.....	197
198 Honey crate.....	6	13.5	..	.25	.....	.....	198
199 Honey extractor.....	6	1.0	..	3.50	.....	.....	199
Corn:							
200 Shock tyer.....	27	1.0	1	.50	.50	.....	200
201 Knife.....	70	2.7	2	.25	.50	.....	201
202 Hand planter.....	61	1.3	1	1.50	1.50	.....	202
203 Ensilage fork.....	6	1.0	..	1.00	.....	.....	203
204 Seed tester.....	42	1.5	1	.50	.50	.....	204
205 Seed rack.....	9	1.3	..	1.00	.....	.....	205
206 Husking peg.....	30	2.9	2	.10	.20	.....	206
207 Husking gloves (pr.).....	12	1.3	..	.75	.....	.....	207
Hay:							
208 Stack cover.....	3	2.0	..	8.00	.....	.....	208
209 Carrier.....	30	1.1	1	3.00	3.00	.....	209
210 Hoisting fork.....	58	1.1	1	1.25	1.25	.....	210
211 Pulleys.....	55	4.5	4	.40	1.60	.....	211
212 1-inch hay rope (ft.).....	61	132.5	110	.....	5.00	.....	212
213 ½-inch trip rope (ft.).....	30	65.0	40	.....	.45	.....	213
214 Hand fork.....	88	3.2	3	.60	1.80	.....	214
215 Baled hay hook.....	21	1.6	1	.30	.30	.....	215
216 Scythe and snath.....	88	1.4	1	1.25	1.25	.....	216
217 Hand seeder.....	70	1.1	1	5.00	5.00	.....	217
218 Sickle.....	32	1.1	1	.50	.50	.....	218
219 Slings.....	9	2.7	..	2.00	.....	.....	219
220 Knife.....	67	1.2	1	.75	.75	.....	220
Small grain & seed:							
221 Cradle.....	48	1.0	1	5.00	5.00	.....	221
222 Binder cover.....	36	1.0	1	3.00	3.00	.....	222
223 Flail.....	15	1.6	..	.....	.....	.....	223
224 Measure.....	33	1.4	1	.50	.50	.....	224
225 Straw fork.....	15	1.2	..	.70	.....	.....	225
226 Hand rake.....	36	1.3	1	.25	.25	.....	226
227 Sacks.....	97	38.6	38	.20	7.60	.....	227
228 Scoop shovel.....	82	1.7	2	1.00	2.00	.....	228

SUMMARY OF INVENTORIES—Continued

Items	Per cent farms reporting	Average per farm reporting	Number suggested	Cost	Total	Inventory	
						Num-ber	Price of each
Sugar beets:							
229 Beet fork.....	3	2 0	..	\$1.50	\$....	.....	229
230 Beet hoe.....	3	6 0	..	.50	....	.....	230
231 Beet topper.....	3	9.0	..	.25	....	.....	231
Potatoes:							
232 Scoop.....	3	1.0	..	1.50	..	.....	232
233 Fork or hook.....	39	1.4	1	1.50	1.50	.....	233
234 Hand planter.....	3	1.0	..	1.75	....	.....	234
Maple sugar:							
235 Sap bucket.....	21	471 0	..	.20	....	.....	235
236 Spout.....	15	485 0	..	.03	....	.....	236
237 Cover.....	3	500 0	..	.06	....	.....	237
238 Scoop.....	12	1 0	..	1 00	....	.....	238
239 Gathering pail.....	12	2 5	..	.75	....	.....	239
240 Tapping bit.....	9	2 0	..	.30	....	.....	240
Total cost of items suggested.....					\$270.70	.....

A careful study of the foregoing list will bring out many points worthy of consideration. To the owner of a farm who has no occasion from time to time to collect the miscellaneous equipment and take account of its extent, this study will probably suggest the advisability of taking an annual inventory of the small as well as the large equipment in order to keep track of his investment. The practice of taking an inventory even of the larger pieces of machinery, is not as common as it should be, and in many cases where an invoice is taken the "small stuff" is lumped in one item. During the process of taking the inventories used in compiling this circular the owner almost invariably expressed astonishment at the extent to which his capital was invested in miscellaneous articles. The tenant farmers, and especially those who have frequent occasion to move, will ordinarily be found better posted as to the extent of the miscellaneous equipment, and the equipment of the latter will usually be found to be much nearer the actual necessities than the equipment of the resident owner. To both of these classes, however, it is earnestly suggested that, following an inventory for the purpose of determining the number and the value of articles on hand there should be provision made for keeping track of the various articles in a systematic manner. Only in this way can loss through theft and carelessness be avoided; time saved through a knowledge of where the articles can be found when wanted; expense through duplication of item when the original article cannot be found for the time being be rendered unnecessary, and depreciation on account of neglect be reduced to a minimum. It is unnecessary to dwell upon these points, as they will be apparent to the business-like farmer.

This list is also suggested as containing possibilities of great value to the prospective farmer. To the average person the compiling of a complete list of articles necessary for use on the average sized general farm becomes almost an impossibility after he has listed the larger items such as machinery, wagons, etc. This applies as well to the man with some farm experience as to the one who engages in it for the first time. The experience of several men, born and raised on the farm and temporarily separated from it during a college course, will bear out this statement. One of these was actually in charge of an experimental farm for four years prior to taking up farming on his own account, yet his initial allowance for small tools and sundries was only \$25.00. After going over an incomplete list similar to the foregoing he purchased a very modest lot of small tools, amounting to over \$100.00 in value, from a local hardware dealer, thereby obtaining a cash discount of 10 per cent.

A recent graduate of the Ohio State University, before engaging in farming on his own account on a portion of his father's farm, kept in mind for four or five months the problem of getting a complete equipment within his means. He first noted all the items which he considered necessary, basing his list on his previous experience. His second step consisted of the task of obtaining the net retail prices of the various articles. The result was a total so large that the third and most difficult step—that of determining the actual necessities—was pursued diligently for a considerable time. Having finally reduced his list to the minimum he entered into negotiations with several of the local merchants. Two of these made special efforts to obtain his order and each made the suggestion that he take a trip at the merchant's expense to one of the cities in the state, and select his equipment from the large stocks in the wholesale supply houses. He accepted one of these offers, and, during the State Fair, spent a half day in a large warehouse selecting the style and quality of articles he desired. The goods were shipped to the local dealer, who obtained his profit and still made a cash discount of 10 per cent from the ordinary prices. The young farmer brought his entire stock of miscellaneous equipment from the store at one trip with a team and wagon, and then spent a day or two arranging his workshop and disposing of his various items in the most convenient places, the extent of his outlay impressing him with the necessity for taking systematic care of the smallest details. Several items which were not up to the standard were taken back and exchanged for perfect goods at the local store, hence the entire outfit was delivered at the farm with very little expendi-

ture of time and annoyance and in perfect condition. By following this method the farmer was enabled to make his selection from well known brands and from a larger stock than that afforded by the ordinary store, besides having a pleasant outing in connection. His total purchase amounted to \$125.00, a part being for household use. The following were charged against the farm business:

1 Leather halter.....	\$ 1.65	Brought forward.....	\$61.05
1 Gallon paint.....	1.50	1 Horse Blanket.....	3 00
1 Gallon barn paint.....	.85	1 Whip.....	.25
1 Bottle "3 in 1" oil.....	.10	1 Monkey wrench.....	.40
1 Small oil can.....	.05	1 Alligator wrench.....	.25
1 Leather punch.....	.60	1 Paint Brush.....	.15
2 Pair gloves.....	.20	1 Cahoon seed sower.....	4 50
1 Pair shucking gloves.....	.50	1 Saw set.....	1 00
1 Shucking peg.....	.20	1 Log chain, 15 feet.....	1 72
1 Riveting machine.....	.50	1 Axe and handle.....	1 00
1 Soldering iron.....	.30	1 Boy Axe.....	.75
1 Crowbar, 16 pounds.....	.64	1 Cold chisel.....	.20
1 Center punch.....	.10	1 Chisel, 3-4 inch.....	.30
1 Draw knife.....	.60	1 Chisel, 1-inch.....	.35
1 Garden hoe.....	.35	1 Rope, 1-2 inch, 50 feet.....	2 55
1 Grindstone.....	3 75	1 Hoisting block.....	2 50
1 Buggy robe.....	8 00	1 Tinner snips.....	.35
1 Blacksmith's vise, 5 inch.....	6 00	1 Road scraper.....	5 00
1 Tamper.....	1 00	1 Steel square.....	.85
1 Pair scales, 600 pounds.....	11 00	1 Nail hammer.....	.75
1 Oilstone.....	.50	1 Ball pein hammer.....	2 25
2 Gallons of harness oil.....	2 00	1 Jack screw.....	2 25
1 Jack plane.....	2 00	1 Pipe wrench.....	1 50
1 Paint brush.....	.65	1 Currycomb.....	.20
1 Ratchet brace.....	1 75	3 Clevises.....	.24
1 Bit, 1-4 inch.....	.20	1 Crosscut saw and handle.....	2 80
1 Bit, 5-16 inch.....	.20	6 Files.....	.75
1 Bit, 7-16 inch.....	.20	1 Grub hoe.....	.45
1 Bit, 1-2 inch.....	.25	1 Garden hoe.....	.35
1 Bit, 10-16 inch.....	.30	1 Horse brush.....	.45
1 Bit, 12-16 inch.....	.30	1 Horse brush (tail).....	.15
1 Bit, 1 inch.....	.40	1 Hatchet.....	.75
1 Hand saw.....	1 75	1 Lantern.....	.90
1 Hand saw.....	.90	1 Fork, 4 prong.....	.60
1 Hack saw.....	.45	1 Punch.....	.10
1 Compass saw.....	.25	1 Pick and handle.....	.60
1 Pair of pliers.....	1 00	2 Boxes copper rivets.....	.20
1 Post hole digger.....	.30	2 Boxes tubular rivets.....	.10
1 Screw driver.....	1 25	1 Spade.....	.60
2 Shovels.....	.35	1 Ditching spade.....	1 00
1 Scoop shovel.....	1 20	1 Snath.....	.75
1 Plastering trowel.....	.75	1 Scythe.....	.75
2 Wedges.....	.62	1 Wheelbarrow.....	1 75
1 Fork, 3 prong.....	.40	1 Hay knife.....	.75
1 Whetstone.....	.65	1 Feed basket.....	.80
1 Mail box.....	.05	1 Pair nippers.....	.75
1 Wagon jack.....	1 00	1 Sledge and handle.....	.90
1 Bucket.....	1 00	3 Quarts of paint.....	1 15
1 Set ladder irons.....	.95		
12 Bolts, 14-inch.....	1 35	Total.....	\$106.86
	.49	Less 10 per cent cash discount.....	10.69
Carried forward.....	\$61.05	Net cost.....	\$ 96.17

A similar course might well be pursued by many persons who are about to engage in general farming. As before stated, the saving through the merchant's discount is considerable. The merchant who furnished the majority of the prices contained in the tables stated that for a large bill of goods such as those under discussion, he could afford to give from ten to twenty per cent discount for cash on account of the size of the order and the saving in the cost of selling. This would pay interest on the investment for some years, to say nothing of the time which would be saved through having the stock complete at the beginning.

On nearly every farm some articles will be found which have been bought second hand, and perhaps others which have been acquired gratis with the place. No doubt a considerable saving may be effected by securing articles at odd times when work is not pressing. If, however, the business of the farm is stopped during attendance at a sale, it is an open question whether the saving on minor items over the suggested method will be sufficient to cover the time spent. As a rule these articles are summed up in the sale bill as "too numerous to mention" and no idea is given as to the extent or condition of the offering.

The lists given are in the nature of a census in that they present data from which the individual may secure the information suited to his own use. They are presented in that light, rather than as a recommendation of what should be purchased. Farmers' Bulletin 347, following a discussion of the various workshop tools, contains this paragraph:

"Shop Equipment:—The complete equipment of a shop for the making of general farm repairs should include the above blacksmithing outfit, the \$25.00 collection of wood-working and general-purpose tools, a pipe-working combination, miscellaneous tools, harness-repair outfit, a workbench, a pair of sawhorses, and a grindstone. This entire equipment for a shop can be secured for about \$100.00 in a fair quality of goods, and for \$150.00 tools of excellent quality can be obtained."

The great quantity of other general purpose items, together with those for use in connection with the producing enterprises, and the stock of materials needed for the repair of farm equipment, will easily bring the total cost of a good working equipment in miscellaneous articles up to \$250.00. The expenditure of this sum for this purpose in the organization of the farm is probably out of the question for many farmers, but due consideration at the outset for the necessary investment in minor items will save much inconvenience and disappointment later.

SUMMARY

Few farmers realize the extent of their investment in the small items of equipment or the time and inconvenience involved in buying numerous articles singly or in small lots. Before planning the farm equipment due consideration should be given to the necessary outlay for minor items, and, where possible, the latter should be secured at one purchase, thereby saving time, and usually money. The purchase of these articles in such a manner will mean a total expenditure sufficient to impress the farmer with the need for their systematic care. The minor items for a general farm of 160 acres in Ohio and other Middle Western states will probably cost from \$200.00 to \$300.00 by the time the equipment is complete.

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